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Interim Progress Report for  
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Advanced Signal Processing Techniques  
for Wireless Communications

*for the period*

June 1, 1996 through November 30, 1996

Principal Investigator: Prof. Gregory W. Wornell

Research Laboratory of Electronics  
Massachusetts Institute of Technology  
Cambridge, MA 02139-4307

Efficient solutions fundamental problems of wireless communication continued to be explored during this period. This has included our work on developing promising new and bandwidth-efficient classes of time, frequency, and space diversity strategies for single- and multi-user wireless communication in multipath fading environments. A particular focus during this reporting period has been on techniques for exploiting transmitter antenna arrays to combat the effects of fading in wireless systems, and some exciting new results have been obtained. The full set of results for this period are described in detail in the following publications.

1. G. W. Wornell and M. D. Trott, "Efficient Signal Processing Techniques for Exploiting Transmit Antenna Diversity on Fading Channels," to appear in *IEEE Trans. Signal Processing*, Special Issue on Signal Processing Advances in Communications, Jan. 1997.
2. A. Narula, M. D. Trott, and G. W. Wornell, "Information-Theoretic Analysis of Multiple-Antenna Transmission Diversity for Fading Channels," in *Proc. Int. Symp. Inform. Theory and Appl.* (Victoria, Canada), Sept. 1996.
3. B. Chen and G. W. Wornell, "Efficient Channel Coding for Analog Sources using Chaotic Systems" in *Proc. IEEE GLOBECOM*, (London), Nov. 1996.
4. J. M. Ooi and G. W. Wornell, "Decentralized Control of a Multiple Access Broadcast Channel: Performance Bounds," to appear in *Proc. Int. Conf. Dec. Control*, (Japan), Dec. 1996.
5. J. M. Ooi and G. W. Wornell, "Fast Iterative Coding Techniques for Feedback Channels," submitted Oct. 1996 to *IEEE Trans. Inform. Theory*.
6. A. Narula, M. D. Trott, and G. W. Wornell, "Information-Theoretic Analysis of Multiple-Antenna Transmission Diversity," submitted Nov. 1996 to *IEEE Trans. Inform. Theory*, Nov. 1996.
7. S. H. Isabelle and G. W. Wornell, "Recursive Multiuser Equalization for CDMA Systems in Fading Environments," in *Proc. Allerton Conf. Commun, Contr., Signal Processing*, (Illinois), Oct. 1996.

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